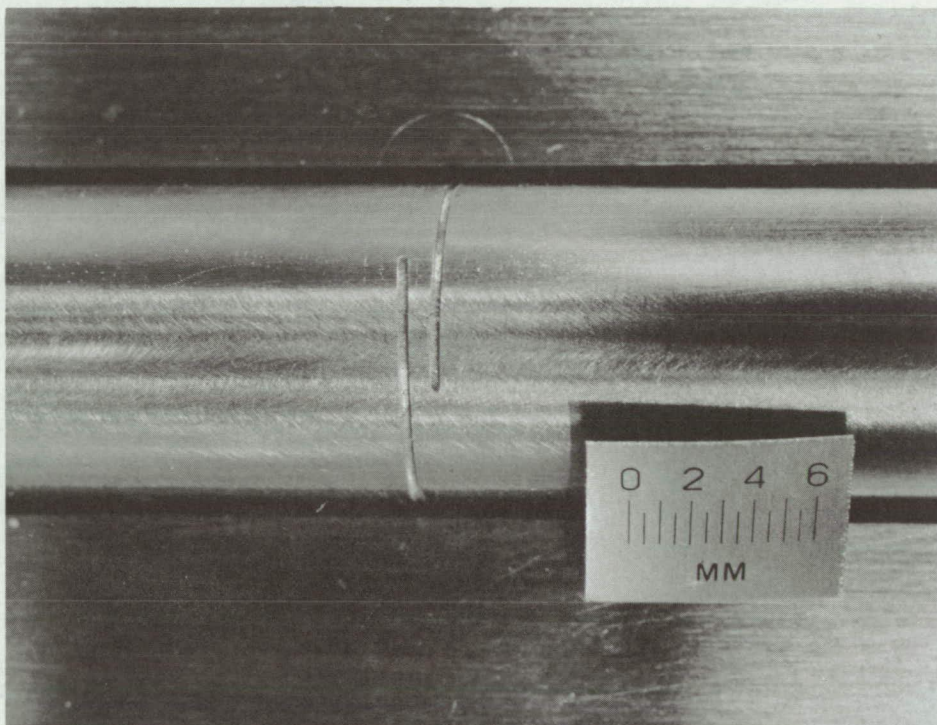


NASA TECH BRIEF



NASA Tech Briefs announce new technology derived from the U.S. space program. They are issued to encourage commercial application. Tech Briefs are available on a subscription basis from the National Technical Information Service, Springfield, Virginia 22151. Requests for individual copies or questions relating to the Tech Brief program may be directed to the Technology Utilization Division, NASA, Code UT, Washington, D.C. 20546.

Thermocouple Installation in Thin-Walled Tubes



Thin-Wall (0.012 in.) Tube Showing Two 0.010-in.-Wide by 0.010-in.-Deep Milled Instrument Slots.

Commercially available thermocouple assemblies can now be installed in thin-walled devices without causing major weak spots in the walls. Tests were conducted with surface temperatures of up to 1095°F for several hours, including up to 100 on/off cycles, without failure.

In the assembly described, a slot 0.010 in. wide by 0.010 in. deep was milled around the circumference of a 347 stainless steel tube with a wall thickness of

0.012 in. Both this slot and the thermocouple assemblies to be used were then electrolytically flashed with 0.0001 in. of gold to enhance the brazing process. Each thermocouple assembly was shaped and fitted so that its sensing tips were in the desired position in the slot and the entire assembly itself was inside the slot. The thermocouples were temporarily held in place by prick-punch upsets along the slot edges and were brazed to the slot with a brazing material com-

(continued overleaf)

posed of 82% gold and 18% nickel by weight. Brazing was performed in a vacuum furnace at 1820°F.

The completed assembly was a stainless steel thin walled tube with several thermocouples mounted flush around its circumference. The installation procedure did not significantly change the calibration of the thermocouples used.

Notes:

1. This method can be applied to a variety of thin-walled devices such as heaters, heat exchangers, and medical catheters.

2. No additional documentation is available. Specific questions, however, may be directed to:

Technology Utilization Officer

Lewis Research Center

21000 Brookpark Road

Cleveland, Ohio 44135

Reference: B70-10655

Patent status:

No patent action is contemplated by NASA.

Source: Arthur N. Curren and Kurt C. Wycoff

Lewis Research Center

(LEW-11222)